United States Department of Agriculture

Natural Resources Conservation Service

NRCS

November 2004

Henry's Fork Agricultural Corridor Wildlife Habitat Conservation Case Study

NRCS Watershed Science Institute - Wildlife Habitat Management Institute

Henry's Fork Agricultural Corridor
Wildlife Habitat Conservation Case Study

Principal Investigators
Professor Craig W. Johnson
Department of Landscape Architecture & Environmental Planning
and
Professor Richard E. Toth
Department of Environment and Society

Utah State University

Research Assistants
Keith Christensen
Kimberly Karish

Data Contributors
Kim Goodman
Steve Bondi
Teton Regional Land Trust
Charlie Sperry
Henry's Fork Foundation

Graphic Layout and Design
Keith Christensen
Abraham Medina

Editor
Mary Ellen Heiner

Funded and Coordinated with
USDA Natural Resources Conservation Service
Watershed Science Institute
Wildlife Habitat Management Institute
Hank Henry – Coordinator

November, 2004

Cover photo credit: Hank Henry

Acknowledgements

Natural Resources Conservation Service (NRCS)

Preparing this case study required the collaboration of many individuals. NRCS Watershed Science and Wildlife Habitat Management Institute personnel played a significant role; their thoughts, suggestions and constructive criticism contributed to the case studies content, integration with *The Handbook* and its focus on practical applications for those involved in similar watershed scale planning projects.

NRCS and outside reviewers made numerous insightful recommendations. Their insistence on accuracy and adherence to NRCS planning procedures and conservation principles detailed in *The Handbook* were most helpful. NRCS reviewers included **Carolyn Adams**-NRCS, Director Watershed Science Institute, NC; **Ken Beckmann**-NRCS, District Conservationist, ID; **Gary Bentrup**-USFS National Agroforestry Center, Watershed Planner, NE; **Frank Fink**-NRCS, State Biologist, ID; **Pete Heard**-NRCS, Director, Wildlife Habitat Management Institute, MS; **Hank Henry**-NRCS, Terrestrial Ecologist, NC; and **Kathryn Boyer**-NRCS, Fisheries Biologist, OR.

Outside reviewers included **Dennis Aslett**-Idaho Department of Fish and Game, Regional Biologist, ID; **Kyle Babbit**-Henry's Fork Foundation, Planning Consultant, ID; **Kimberly Goodman**-Teton Regional Land Trust, Special Projects Coordinator, ID; **Karen Lords**-Fremont County Planning Commission, ID; **Jeff McCreary**-Ducks Unlimited, Regional Biologist, UT; **Lee Nellis**-Sonoran Institute, Planner, CO; **Ron Rope**-Idaho National Energy and Environmental Lab, Advisory Scientist, ID; and **Charlie Sperry**-Montana Fish, Wildlife and Parks, Recreation Specialist, MT. We also wish to acknowledge our indebtedness to the researchers, authors, and planners whose work we referenced extensively.

Numerous individuals provided photographs. They are credited in the Case Study. We are particularly indebted to **Jared Barnes**, CA; **Dave Bell**, UT; **Gary Bentrup**, NE; **Lynn Betts**, IA; **Hank Henry**, NC; **Craig Johnson**, UT; **Abe Medina**, ID; **Dick Rol**, CA; **Richard Toth**, UT; and **Utah Division of Wildlife Resources**. Thank you to **Keith Christensen** for his artistic touch and computer skill in preparing the final report layout.

Richard Toth

Table Of Contents

Preface

Natural Resources Conservation Service (NRCS)

In 1999, the Natural Resources Conservation Services (NRCS) Watershed Science and Wildlife Habitat Management Institutes developed a comprehensive watershed scale wildlife habitat planning tool to be incorporated into the National Biology Handbook (*The Handbook*). While *The Handbook* presents sound ecological principles and methodologies, application of this technology for wildlife conservation at a watershed scale on private property is relatively sparse.

The NRCS is the United States Department of Agriculture (USDA) agency charged with providing assistance to private landowners and communities who voluntarily participate in conservation programs. The NRCS actively promotes conservation corridor planning for wildlife at a watershed scale. However, it recognizes that the long-term wildlife conservation value of corridors is highly dependent on the health of the adjacent landscape and large patches of native vegetation. Implementing successful watershed scale wildlife conservation projects requires the cooperation of private landowners, local governments, private non-profit conservation organizations, and state and federal agencies working at both the watershed and site-specific scale. Partnerships and cooperation among many of those committed to land, water, and wildlife conservation are already a reality in the Henry's Fork watershed. The key to success of present and future wildlife conservation efforts will be a vision shared by farmers, ranchers, developers, and communities willing to support and participate in conservation projects.

This case study has been prepared for NRCS field office personnel and their partners in wildlife conservation. It is primarily directed at assisting those involved in watershed scale wildlife corridor planning projects in agriculturally dominated landscapes like the lower Henry's Fork. All aspects of the case study are tiered to the methodology and principles detailed in *The Handbook*.

Craig Johnson

Background

Natural Resources Conservation Service (NRCS)


Craig Johnson

To add examples of implementation, the Henry's Fork watershed of the Snake River in southeastern Idaho was selected as a case study site. Specifically, a 40-mile reach of the lower Henry's Fork and its immediate watershed downstream from the confluence of the Warm River were identified for study. This reach of river flows through privately owned ranch land and productive winter wheat, barley, and potato farms. The river is important to the region's agricultural and tourist-based economies–a source of irrigation water, scenic quality, and a world-renowned fishery. Trumpeter swans, bald eagles, osprey, waterfowl, mule deer, whitetail deer, moose, and a diversity of other species inhabit this reach of the river.


Craig Johnson

Like many watersheds with few residents, breathtaking scenery, world-class fishing, and other recreational opportunities, the Henry's Fork is experiencing increased development pressure. Consequently, property values in the Henry's Fork Corridor and its tributaries are rapidly rising. At the same time, agriculture in the region is in economic decline. Increasing numbers of farmers and ranchers are considering the option of selling all or portions of their property to developers.


Craig Johnson

The environmental consequence of this change in land-use patterns is fragmentation--the breaking up of large patches of native vegetation (more recently agricultural and rangeland) into smaller, increasingly isolated patches. At risk are the fish and wildlife heritage, scenic quality, recreational opportunities, and rural life style of the region. Habitat fragmentation diminishes capacity of the Henry's Fork watersheds to sustain healthy wildlife populations or metapopulations in five ways:

- Loss of original habitat
- Reduced habitat patch size
- Increased edge
- Increased isolation of patches
- Modification of natural disturbance regimes


Hank Henry

Conservation of open space, agricultural resources, and fish and wildlife habitat in the Henry's Fork agricultural corridor has been the focus of several non-profit organizations and government agencies for many years. The Teton Regional Land Trust (TRLT) is the leader in a partnership with The Nature Conservancy (TNC), Henry's Fork Foundation (HFF), NRCS, Idaho Department of Fish and Game (IDFG), and the Bureau of Land Management (BLM) in pursuing an Agricultural Corridor Initiative (collectively, the Henry's Fork Ag Corridors Working Groups). The Henry's Fork Watershed Council (the Council), which has endorsed the working group, provides an important forum for all interested in the watershed and its future. The Council is a vital community-based network that facilitates communication, cooperative projects, and research related to the health of the watershed.

Dick Rol

The TRLT and partners have defined a specific goal for their Henry's Fork Agricultural Corridor Project:

"We are prioritizing areas in need of protection and working with landowners, agencies, and local representatives to protect valuable agricultural and natural resources in Fremont and Madison Counties. The areas we are targeting include stream corridors and farmlands that support waterfowl flyways and wildlife migration corridors, cottonwood forests, open space, and a high quality, scenic recreational experience" (TRLT, 2001).

Craig Johnson, Richard Toth, UDWR

Case Study Site

Natural Resources Conservation Service (NRCS)

The Henry's Fork watershed is large, complex, and picturesque. Over 800,000 acres of the upper watershed are in public ownership. Elevations range from 10,240 feet at Targhee Peak to near 4,500 feet at the confluence of the Teton and Henry's Fork Rivers (Figure 1). Precipitation varies from 40 inches in the upper watershed to 10 inches in the case study site. In the lower watershed, most of the precipitation falls in May and June.

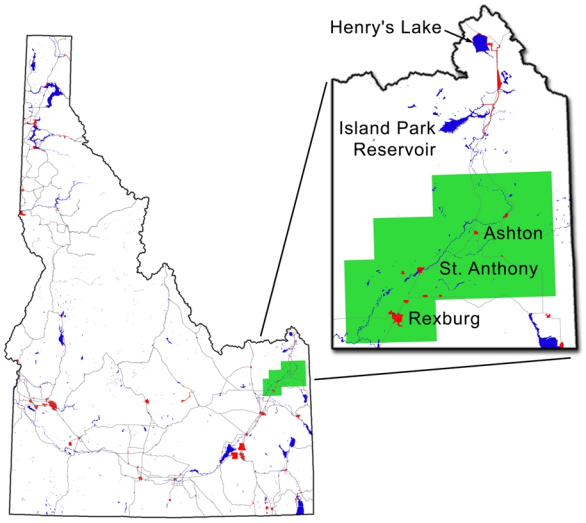

Figure 1 - Location map.

Forest and range land predominate in the upper watershed. Rolling loess hills and basaltic plains define the lower reaches of the watershed supporting row crop agriculture and ranching. This working landscape, the site for the case study, is populated by scattered farms and ranches supported by small, rural communities. Agriculture, ranching, and tourism are mainstays of the regional economy (Figure 2). The case study site corresponds with the area being researched by TRLT and its conservation partners.

Craig Johnson

Figure 2 - The lower Henry's Fork watershed is a working landscape producing cattle, wheat, potatoes, and large rainbow trout.

The case study will focus on the Henry's Fork riparian corridor, located within the landscape context of the lower reaches of the river. This area was selected for more detailed analysis because it is experiencing some of the most intense development pressure in the watershed. The detailed site is two miles wide (approximately one mile from the top of the bank on either side of the Henry's Fork River) and approximately 40 miles in length (Figure 3). In some locations, the study corridor was widened to include habitats or other resources of importance as determined

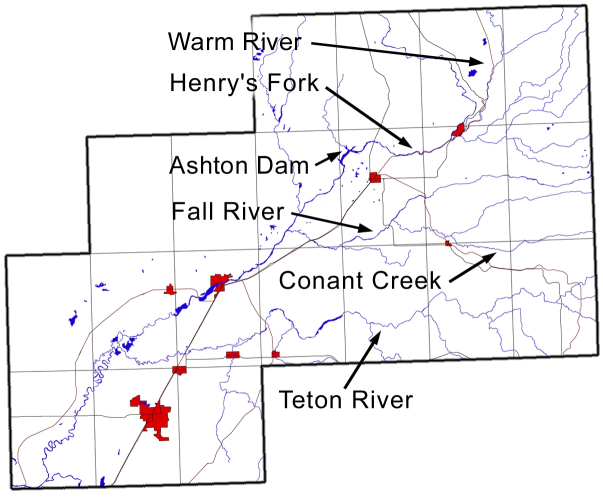

Figure 3 - The lower Henry's Fork and its main tributaries.

by the research team. The study corridor begins at the confluence of the Henry's Fork and Warm River downstream to the confluence with the Teton River. The study will also include the Fall River and Conant Creek--major tributaries of the Henry's Fork.

Craig Johnson

Figure 4 - The Henry's Fork flows through an incised canyon at the northern end of the study site. The inactive point bar has reverted back to shrub-steppe habitat.

There are three distinct segments to the Henry's Fork within the case study corridor. The upper segment extends from the Warm River confluence downstream to Ashton Dam. An incised river basin characterizes this segment--steep side slopes bounded by gently sloping uplands (Figure 4). Soils in this segment (Marytown-Robinlee and Greentimber) are deep, well-drained of loess origin underlaid by glacial deposits. In some locations underlying basalt is exposed. Pre-Anglo settlement upland plant communities were dominated by grasses including wheatgrass (Agropyron sp.), needle grasses (Stipa sp.); and Idaho fescue (Festuca idahoensis); shrubs including sage (Artemisia sp.), service berry (Amelanchier alnifolia), bitterbush (Purshia tridentata), and rabbitbrush, (Chrysothamnus sp.) Along this segment of the Henry's Fork, the riparian zone is narrow with occasional stands of river birch (Betula occidentalis), alder (Alnus incana), willow (Salix sp.), and chokecherry (Prunus virginiana). Sedges (Carex sp), rushes (Juncus sp.), and grasses dominate the banks. Old inactive point bars and deltas are vegetated by xeric shrub-steppe plant communities.

The middle segment runs downstream from Ashton Dam to the water diversion below St. Anthony. In this segment, the river channel is typically less than 10 feet below the adjacent uplands. Several large side drainages intersect the Henry's Fork in this segment (Figure 5). Soils include a segment of those described above and Rexburg-Ririe and Kucera soils, which are deep, well-drained, and formed in loess. Below the Fall River confluence, the soils including St. Anthony- Allewitt and Eginbench, which are deep with drainage varying from well-drained to

Dave Bell

Figure 5 - The middle segment of the Henry's Fork flows through range land and irrigated pasture.

poorly drained. Basalt formations are evident in some locations. Pre-settlement upland vegetation was similar to that described above. The riparian zone remains narrow until just above St. Anthony. Rushes, sedges, and grasses are dominant ground covers with occasional stands of Cottonwood (Populus trichocarpa), box elder (Acer negundo), willow, river hawthorn (Crataegus douglasii), and chokecherry.

The lower segment is characterized by a broad floodplain and sinuous channel alignment. The river channel is braided in many locations with active point bars, bank erosion on the outside bends, and numerous oxbows (Figure 6). Cottonwoods dominate the plant community with occasional large stands of river hawthorn, willow, dogwood (Cornus sericea), and chokecherry. Plant species diversity and community structural diversity is highest in the

Hank Henry

Figure 6 - The Henry's Fork is broad, frequently braided, and has an extensive flood plain as it exits the southern end of the study site.

lower segment. In the first two miles below the St. Anthony diversion, cottonwood stands are in senesance with little recruitment of young cottonwoods. Numerous irrigation canals extend into the agricultural matrix and function as ephemeral riparian corridors (Figure 7). Soils in the lower segment are deep with variable drainage, the same general soils groups that are found downstream of the Fall River confluence.

Jared Barnes

Figure 7 - Canals, roadsides, and other introduced corridors provide wildlife habitat and connectivity in the lower Henry's Fork Watershed.

Henry's Fork flow rates through the 40-mile study corridor are regulated by management of two upstream dams and Ashton Dam (see Figure 1). In addition, several water diversions affect river flow during the growing season. Upland irrigation affects groundwater levels, and return subsurface flows to the river result in occasional seeps and saturated bank soils.

Craig Johnson

The Henry's Fork, its tributaries, and related canal system function as habitats and corridors for migration and dispersal for a variety of wildlife species. In cold shrub-steppe landscapes like the case study site, riparian corridors and wetlands are among the most important habitat types. Over 80% of all vertebrate species use these habitat types at least once during their life cycle. The Henry's Fork corridor may be the key to biodiversity conservation in the lower segment of the watershed.

Craig Johnson

Methods

Natural Resources Conservation Service (NRCS)

The NRCS three-phase, nine-step planning methodology was used in this case study. Geographic Information System (GIS) technology was used to view, combine, and analyze sets of spatial and tabular data. Arc View and Arc Info programs were employed to generate maps. USGS 1-24000 quad sheets were used as the mapping base. Resource maps were generated using existing digital data sources. Fremont and Madison County soils maps and aerial photographs were referenced in delineating corridor boundaries. The TRLT and partners shared their digital data; additional data were collected from Internet sources. Preliminary field studies were conducted within the 40-mile Henry's Fork Agricultural Corridor detailed study area. Budget limitations precluded more detailed field research. Literature reviews were conducted and local biologists, ecologists, soil scientists, and planners were interviewed to gather additional information. Inventory data were analyzed and alternative plans prepared by the principal investigators. Plans were reviewed by planners, ecologists, NRCS personnel, and TRLT and planning partners. Revisions were made as necessary and the final document completed.

Craig Johnson

Watershed planning is an interdisciplinary enterprise.

Abe Medina